Dredging Research

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Technologies for treatment of ammonia nitrogen in effluents from confined disposal facilities

by Mike Channell, U.S. Army Engineer Research and Development Center

Ammonia is a common contaminant of concern in effluent at confined disposal facilities (CDFs). Ammonia is generally present in the dissolved form and therefore is not removed by sedimentation processes in the CDF. Ammonia becomes an issue for 401(b) water quality certification because USEPA and the states have water quality criteria and standards for ammonia in receiving waters based on toxicity to aquatic organisms. Compared to concentrations commonly occurring in CDFs, the ammonia standard of 2-7 milligrams per liter (fresh water depending on temperature) is very low. Ammonia nitrogen also provides an oxygen demand within the CDF and receiving waters that may become a water quality compliance issue.

A number of potential treatment processes are available to treat or remove ammonia from water. These include air stripping, biological treatment, sorption processes, and ion exchange. Biological options include fixed-growth systems, completely mixed suspended growth systems, and wetlands treatment. The cost of some of these processes has prevented their serious consideration for dredging projects until recently. Two dredging sites, Indiana Harbor Canal, Indiana, and Hamburg Harbor, Germany have conducted pilot scale evaluations of ammonia removal from water generated during dredging. Results from these sites are summarized below.

Indiana Harbor and Canal

Indiana Harbor, located at the southern end of Lake Michigan, is in one of the world's largest concentrations of industry. Industrial and municipal effluents, as well as storm water and combined sewer overflows, have led to sediment containing a wide range of organic and inorganic contaminants, including ammonia. The U.S. Environmental Protection Agency (USEPA) Region V and the Chicago District, Corps of Engineers, have developed a joint management plan to dredge and dispose of contaminated sediments in Indiana Harbor. One of the issues raised during the continuing review of the plan is the ammonia concentration in water produced by the dredging project, i.e., water entrained during hydraulic dredging and discharged as CDF effluent or drainage from mechanically dredged material. In order to address this issue, the District performed a pilot scale evaluation of water treatment technologies during the fall of 2000. Water was generated while dredging approximately 3500 yd^3 of contaminated sediment from the canal using an innovative hydraulic dredge developed by Eddy Pump Corporation.

Prior to the pilot demonstration and evaluation, sediment samples collected from the dredging location were characterized chemically and physically and were subject to effluent elutriate testing (USEPA/USACE 1998). Constituents detected in the sediment included PCBs, PAHs, iron, manganese, zinc, and oil and grease. The sediment was characterized as fine sand with 20 to 56 percent

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fines. PAHs and relatively low levels of heavy metals were detected in the elutriate samples. The elutriate ammonia nitrogen concentrations in the unfiltered samples averaged 4.70 milligrams per liter (mg/L). Ammonia nitrogen concentrations in the sediment were detected at a concentration of 25 milligrams per kilogram (mg/kg) (URS Corporation 2000).

Figure 1 is a schematic diagram of the Indiana Harbor dredged material disposal facility and the water treatment train (URS Corporation 2002). Dredged material slurry was pumped into a two-cell settling basin constructed for the project on Ispat Inland property. The diked facility was lined with a 2-ft-thick compacted layer of clay to limit water percolation through the site. The first cell provided primary settling of dredged material solids and the second cell provided additional clarification and equalization storage for water to be treated by the water treatment technologies. Dredging was accomplished over a period of 2 weeks, whereas the water treatment system was operated for a period of approximately 8 weeks. Supernatant from the equalization basin was pumped to the water treatment system at a nominal design rate of 30 gallons per minute.

Prior to entering the ammonia treatment processes, the dredging water was treated for suspended solids removal in a multi-media gravity filter. The primary purpose of the gravity filter was to remove suspended solids and any particulate-associated contaminants. As mentioned earlier, the settling and equalization basin reduced the concentrations of most organic and inorganic contaminants, particularly those that are often associated with the particulate fraction. Organic priority pollutants and heavy metal constituents were at or below detection limits; therefore removal efficiency for these constituents could not be evaluated. However, suspended solids, ammonia-nitrogen, and total organic carbon (TOC) were monitored during the study. Based on a limited number of samples only minor reductions were observed for ammonia nitrogen or TOC. The gravity filter reduced the suspended solids concentration by an average of 48 percent. Media included sand and anthracite. Filtration or other suspended solids removal technologies would likely precede any water treatment unit process for dredged material or CDF effluent. As shown in Figure 1, three ammonia treatment technologies were evaluated in parallel:

- Sequencing batch reactor (SBR)
- Granular activated carbon (GAC)
- Aerated media filter (AMF)

Specifications for each of these systems are provided in Table 1. A sampling and analysis plan was developed by URS and the Chicago District to evaluate the performance of the pilot processes. Full ranges of organic and inorganic parameters were analyzed for influent and effluent. However, PAHs and PCBs for the influent were found to be below the detection limits. This discussion will focus on ammonia nitrogen and suspended solids removal.

Sequencing Batch Reactor (SBR)

The sequencing batch reactor is a biological process that combines nitrification and denitrification in the same reactor. The reactor is initially filled with a bacterial culture acclimated to the dredging water. During the first 1-2 hours the reactor is filled with water and aerated. Under aerobic conditions, the ammonia nitrogen is oxidized to nitrite and then to nitrate. Over the next 4-5 hours, the aerator is turned off and the reactor contents are allowed to go anoxic whereby nitrates are denitrified converting the nitrates to nitrogen gas. Other biodegradable contaminants may also be treated by these processes. After the treatment period, supernatant is discharged from the tank and fresh influent is added to the tank, repeating the cycle.

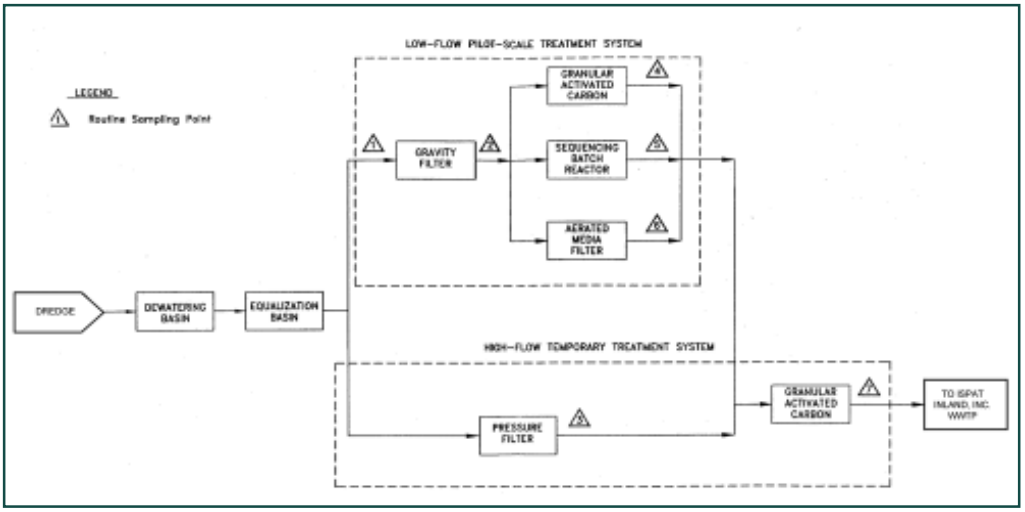

Figure 1. Schematic diagram of dredged material storage facility and the water treatment train

Granular Activated Carbon (GAC)

The granular activated carbon process is an off-the-shelf packed carbon column designed to adsorb organics. Ammonia-nitrogen may also be adsorbed and removed from the water. Carbon adsorption generally offers little capacity for adsorption of ammonia nitrogen, but organic nitrogen may be adsorbed to a greater degree.

Biological films growing on the carbon surfaces may provide for conversion of ammonia to nitrate. With continued use, the carbon will reach its adsorption capacity and cease to be effective. The carbon must then be replaced with fresh carbon, and the spent carbon returned for regeneration using thermal methods. Because of the relatively low organic loading in the CDF effluent, breakthrough (detection of total organic carbon in the treated water) was not observed for the carbon treatment.

Aerated Media Filter (AMF)

The aerated media filter is an up-flow packed filter designed for aerobic fixed-film nitrification. Air and water enter the bottom of the filter and discharge through the top. Biological growth on the artificial filter media converts ammonia-nitrogen to nitrites and nitrates. Periodically the media must be backflushed as the microbial solids grow and clog the filter.

Table 1
Design Criteria for Ammonia Treatment Processes

Unit or Process	Preliminary Criteria	
Carbon Treatment Pilot Unit	Vessel Type	Steel, High Pressure Vessel
	Vessel Size	30-in.-diameter by 60-in. high
	Vessel Capacity	200 gal
	Media Type	Granular Activated Carbon (GAC)
	Media Depth	Approximately 40-in.
	Media Mass	600 lbs of GAC
	Estimated Sorption Capacity of Media	120 lbs of organics
	Flow Rate	12-15 gpm
	Contact Time in Vessel	13 to 16 min
	Change-out Frequency	No change-outs
Aerated Filter Pilot Unit	Type	Up-flow filter for aerobic fixed-film nitrification
	Vessel Size	7-ft by 10-ft
	Clearwell Size	8-ft diam by 5 ft 8 in.
	Total Height	22-ft
	Assumed TSS Loading	4 mg/L
	Assumed BOD Loading	100 mg/L
	Assumed NH3-N Loading	15-20 mg/L
	Column Area	3.1 sf
	Raw Water Loading	4-20 gpm/sf
	Process Flow Rate	12.5 - 60 gpm
	Air Flow Rate	3-35 m^3/h
	Filter Run Time	48 hours
Sequencing Batch Reactor Pilot Unit	Type	Combined-Stage Nitrification/Denitrification
	Reactor Capacity	3,000 gal
	Treatment Rate	1,000 gal/cycle
	Assumed BOD Loading	100 mg/L
	Assumed NH3-N Loading	15-20 mg/L
	Fill Time	1-2 hrs (including anoxic and aerated mixing)
	React Time	4-5 hrs (dependent on BOD, NH3-N and Temp)
	Settle Time	1 hr
	Draw Time	45 min
	Total Cycle Time	8 hrs
	Sludge Waste	93 gal/month
	Sludge Storage	None
	Operation Temperature	15-35 deg Celcius
	pH	7.5 - 9.0
	Trailer Footprint Size	10-ft by 30-ft
	Reactor Height	102 in.

Indiana Harbor Pilot Plant Results

Complete results for the pilot study investigation have been reported by URS Corporation (URS Corporation 2002). A principal objective of the project was to evaluate ammonia removal technologies. Figure 2 shows the ammonium nitrogen concentration with time for the three treatment processes, as well as the gravity filter effluent, which represents the influent to the other three processes. The figure shows that the activated carbon technique removed a relatively small percentage of the ammonia. However both the aerated media filter and the sequencing batch reactor removed ammonia to less than the detection limit of 0.1 mg/L throughout the course of the study. This suggests that these biological systems should be considered for treatment of CDF effluent where ammonia concentrations in the CDF effluent exceed water quality standards.

It should be noted that over the course of the study (a six-week period), the ammonia concentration in the influent steadily declined, suggesting that processes in the settling and equalization basins were reducing ammonia concentrations. Likely processes include volatilization and biological activity.

Hamburg Harbor (Netzband and Rohbrecht-Buck 1992)

Hamburg Harbor has also implemented water treatment due to ammonia nitrogen concentrations in dredging-related effluent, but the driving environmental and regulatory issue is nitrogenous oxygen demand. Ammonia concentrations are significant because their transformation to nitrate contributes to oxygen depletion in the water. Elevated concentrations of suspended solids, heavy metals and ammonia were measured in harbor water after dredging of sediments from Hamburg Harbor. The constituents are primarily found in the fine- grain clay and silt-clay fraction of the dredged

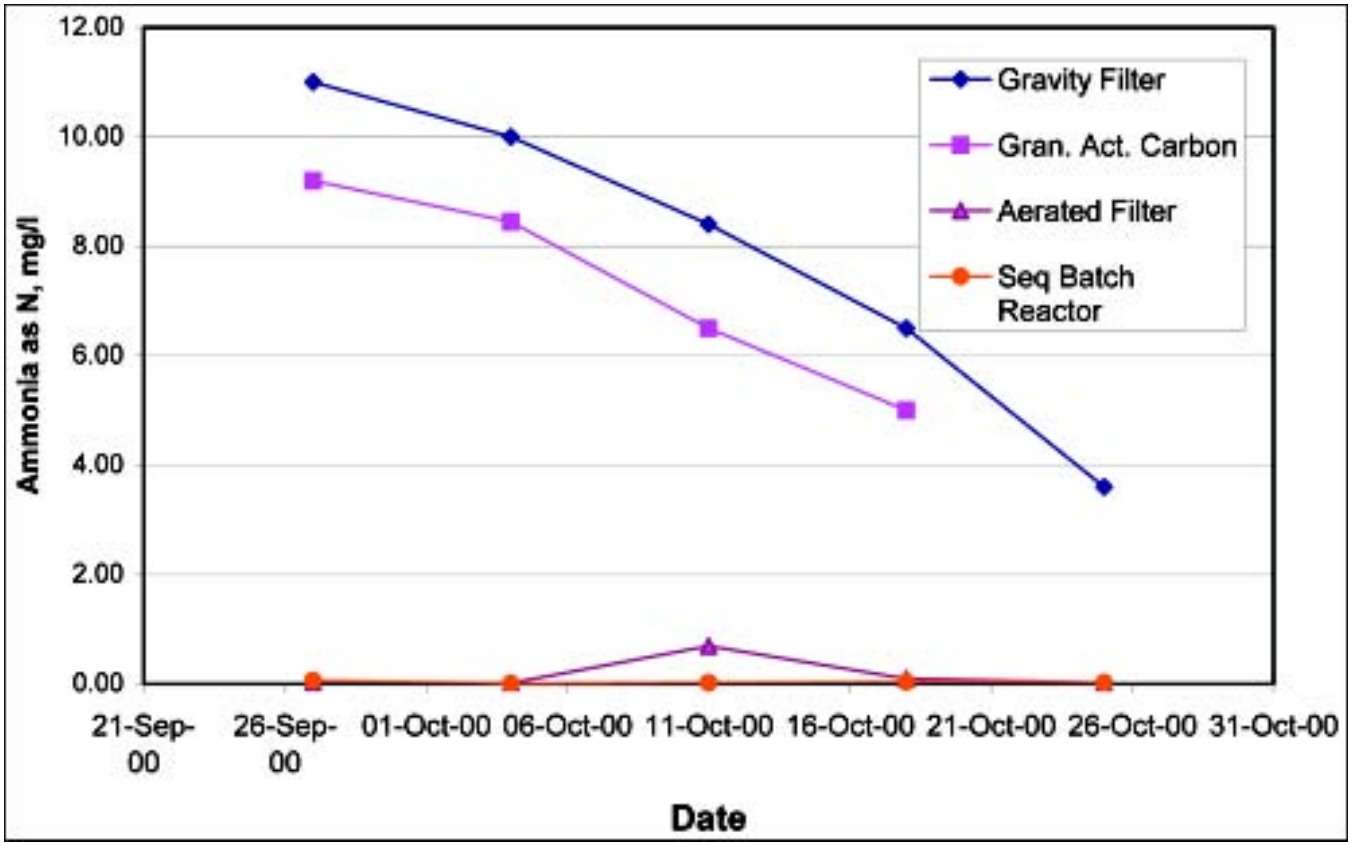

Figure 2. Ammonia removal process effectiveness

material. The content of heavy metals correlates to the content of suspended solids.

Suspended solids were removed in a sedimentation plant through flocculation. The primary flocculant, a ferric chloride solution was added along with a coagulant. This system reduced the suspended solids by 80-90 percent to concentrations less than 25 mg/L. The water from the sedimentation plant was delivered to a biological treatment train for nitrification. The ammonia concentrations in the wastewater fluctuated between 20 and 80 mg/L. The selected treatment for the nitrification plant consisted of a two-stage trickling filter system with a total surface area of 540,000 m^2, four cascades of rotating biological contactors (RBCs) with a surface area of 160,000 m^2, and nine drum cloth filters. The system is designed to remove high concentrations of ammonia in the trickling filter. The RBCs were included in the design as a polishing step.

The trickling filter stage consists of eight separate trickling filters in two stages in series. The material used is a plastic media with a specific surface of 160 m^2/m^3. Each of the eight units is fed by centrifugal pumps, which take the water from one of the sumps belonging to each unit. Hydraulic load amounts to 1.6 to 2.4 m^3/h. The RBC stage consists of four cascades with four rotors in each case providing a surface area of 10,000 m^2 each and a diameter of 3.50 m. The material used was BIONET having a specific surface area of approximately 310 m^2/m^3. Nine drum cloth filters are used to reduce suspended solids concentration in the effluent.

Influent loads to the plant fluctuated between 100 and 700 kg NH_4-N/d. Nitrification rates at water temperatures of just over 0° C were approximately 0.15g NH_4-N/m^2 d. The trickling filter reached a maximum performance with a nitrification rate of 1.0 g NH_4-N/m^2 d.

The RBC was in operation during the entire test or operation. Initially, the RBC was not effective at nitrification. The RBC was dosed with sludge from a nitrifying activated sludge plant, but this did not prove effective. However, performance of the RBC improved with an increase in load and temperature.

More information is available from Mr. Michael G. Channell, ERDC Environmental Laboratory (601-634-2386, *Mike.Channell@erdc.usace.army.mil*).

U.S. Environmental Protection Agency/U.S. Army Corps of Engineers. (1998). "Evaluation of dredged material proposed for discharge in waters of the U.S., Testing manual," EPA-823-B-98-004, Washington, DC.

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Netzband and Rohbrecht-Buck. (1992). "Treatment of effluent from dredged material disposal sites: Suspended solids removal and nitrification," *Water Science and Technology,* Great Britain 25.

Corps fish tagging study in the HARS could net valuable data

by JoAnne Castagna, U.S. Army Corps of Engineers, New York District

Below the waters off the coast of New Jersey, fish are busy moving about as they assist the Corps in a complex fish tagging study that could net valuable data for the Corps and the environmental community.

For over a century, the U.S. Army Corps of Engineers, New York District has dredged the channels within the Port of New York and New Jersey to help facilitate navigation crucial to the national economy. Dredging the port is necessary because fine-grained sediments accumulate on the bottom of the channels that can cause shoaling and interfere with safe navigation.

Historically, dredged material from the Port has been disposed of in the Atlantic Ocean, in and around a 2.2-square-nautical mile area off the shore of New Jersey, commonly referred to as the "Mud Dump Site" (MDS).

In 1997, the U.S. Environmental Protection Agency (EPA) terminated the use of the MDS and redesignated the site and surrounding area that was historically used to dump dredged material as the Historic Area Remediation Site (HARS). The HARS is an approximately 15.7-square-nautical mile area — 3.5 nautical miles east of Highlands, New Jersey and 7.7 nautical miles south of Rockaway, New York.

Only dredged sediment that has been tested and meets EPA's strict biological and chemical criteria can be used as remediation material. These sediments are placed in the HARS to cover or "cap" dredged materials previously placed there. This cap remediates the site and improves habitat conditions for aquatic life in the HARS by covering historic sediments whose contaminant levels may potentially cause environmental concern. EPA has determined that a cap at least 1 meter thick is required to effectively cover the HARS.

"The criteria used to determine whether dredged sediment can be placed at the HARS is among the most stringent in the United States," said Monte Greges, Chief of the Dredged Material Management Section, New York District. To evaluate the potential changes the EPA proposes to make to the current criteria, the Corps' New York District initiated and is funding a fish tagging study that is being conducted and managed by the Corps' U.S. Army Engineer Research and Development Center - Waterways Experiment Station (WES), in Vicksburg, Mississippi. WES contracted the Northeast Fisheries Science Center to perform the study that will determine the residency time of fish in the HARS.

In summer 2003, the 18-month study began and 153 healthy adult fish were tagged in the HARS, including 129 black sea bass (*Centropristis striata*) and 24 summer flounder (*Paralichthys dentatus*), also known as 'fluke,' important recreational and commercial fish.

Two different tags were used– an ultrasonic transmitter that was surgically implanted in the fishes' abdominal cavities and an external tag placed below their dorsal fins. These external tags are labeled "Not for Human Consumption" on one side and have the study manager's phone number on the other.

To pick up the signals from the fish's ultrasonic transmitters, 72 receivers were strategically moored throughout the HARS site, 800 m apart. According to Dr. Mary Fabrizio, the study's Principal Investigator and Chief of the Behavioral Ecology Branch, Northeast Fisheries Science Center, "The signals produced by the transmitters will be detected by the receivers when a fish swims within 400 m of the receivers."

"The transmitters, which are only 30 mm long and 9 mm in diameter, are programmed to send 68-KHz signals (pings) once every 3 to 5 minutes for about 1 full year. Every signal detected by a receiver is "decoded" electronically and the receiver records the identification number of the transmitter, the date, and the time of day the signal was detected. These records accumulate in the memory of the receiver and when the receiver is retrieved, scientists download the data to a laptop computer using an interface between the receiver and one of the communication ports on the laptop."

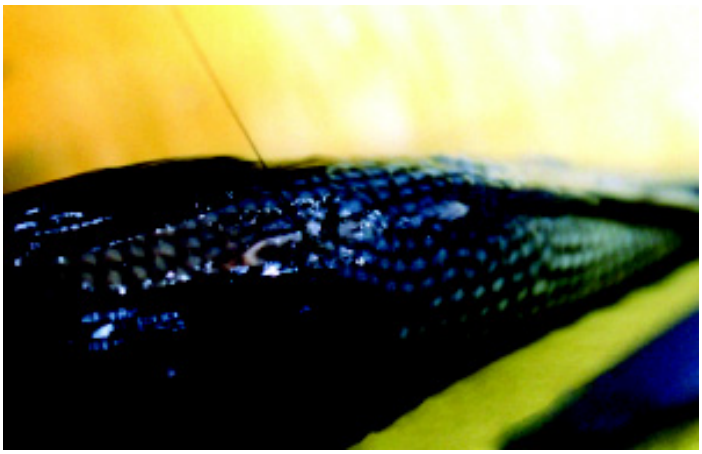
Fabrizio continued, "The next step is to associate a particular receiver and all its data with a particular location; that is, the station where the receiver was moored. We do this by assigning a station identification number to the electronic file associated with each receiver." She added, "Based on retrievals completed in September 2003, we know that over a period of about 3 months, 68 receivers detected over 1.3 million transmissions!"

In June 2004, the study was completed and scientists retrieved the receivers for the last time and downloaded the remaining data. A final report will be completed in December 2004.

Greges said, "In addition to providing a better estimate of residency time of these two fish species at the HARS, this study will also provide data to correlate fish movement and behavior with changes in bottom topography from disposals, changes in water temperature and salinity and storm events. This will be extremely helpful to fishery biologists." Greges added, "This study will also help the New York District develop an environmental risk assessment for the HARS that will more realistically portray the effect that certain contaminants have on aquatic life. Knowing how much time fish spend in the HARS will provide information on the potential level of exposure."

This study is considered "cutting edge." "Most tagging studies of this kind are relegated to bays, lakes, streams and other relatively small "closed areas." This study is the only one performed in a mid-Atlantic continental shelf area," said Fabrizio. She continued, "In addition, this is the first use of ultrasonic transmitters to monitor movement and habitat use by two fish species that are closely associated with the bottom of the ocean. Also, most studies tag 1-2 dozen fish and use maybe a dozen receivers. In this context, this may be the largest study of this type ever performed. The amount of technical data that can be gleaned from it is unprecedented."

Tag 1: Transmitter covered in beeswax is inserted into peritoneal cavity of fish through incision (made by surgeon using a scalpel)



Tag 2: Suturing of incision area. Transmitter has been implanted

Tag 3: Application of Vetbond, a type of super-glue used by veterinarians to ensure the closure of tissues after suturing is complete

Tag 4: Male black sea bass being placed into a recovery tank after surgery

Dredged Material and Recycled Glass: Blending Innovation and Engineering

by Tommy Lee and Tim Welp, U.S. Army Engineer Research and Development Center

The U.S. Army Engineer District, Philadelphia is currently investigating the feasibility of an innovative beneficial use application that involves fine-grained material recovered from confined disposal facilities (CDFs) along the Delaware River. If proven successful, this application will provide a beneficial use of the dredged material and extend the operational lives of NAP CDFs by increasing respective storage capacities. NAP and Apex Environmental, Inc. (Malvern, PA) are conducting this beneficial use project that involves the blending of dredged material (DM) with City of Philadelphia curbside collected glass to determine the feasibility of using the blended material for a suite of landscaping, embankment, and structural fill applications in the urban environment. Apex partnered the City of Philadelphia, PennDOT, and PADEP in the project, as it potentially solves the joint problem of increasing glass recycling and renewable capacity at the Fort Mifflin CDFs. The DM was obtained from Basin A and classified as an organic silt (OH) of moderate plasticity with approximately 80 to 100 percent passing the No. 200 (75-micron) sieve.

The glass was crushed to less than 3/8 in. to eliminate physical handling hazards with less than 1 percent passing the No. 200 (75-micron) sieve. PennDOT has conducted previous research on this type of material (see PennDOT's recycling Web page at *www.dot.state.pa.us*). The crushed glass (CG) was blended at 20 wt% increments with the DM to determine which range of blends would be suitable for the aforementioned fill types based on their geotechnical performance in the laboratory and field construction. Drexel University is conducting the laboratory evaluation (index properties, compaction, strength, hydraulic conductivity, dynamic and consolidation properties.

The field demonstration project was recently completed, using 20/80, 50/50, and 80/20 CG-DM blends. Clean Earth Dredging Technologies, Inc. (CEDTI, Hatboro, PA) completed the pugmill blending and trial embankment construction operations. Numerous public and private stakeholders, including ERDC's Dredging Operations and Environmental Research (DOER) Program, were invited to observe the blending operation and fill construction progress in the ongoing pilot study. The CG and DM were pre-blended using excavators and loaders based on the loose wet bucket density of the

Crushed glass

Blended 80% glass, 20% silt by weight

loader and then were pugmilled using a trailer-mounted pugmill with an operational capacity of 200 tons per hour. Rarely did this approach not meet the targeted blending ratio within a +5wt% tolerance based on samples collected randomly within every 30-minute window of blending and stockpiling operations.

The embankments were constructed with 8-in. lifts according to PennDOT procedures except for the compaction and optimum moisture content criteria. The height of the embankments was 12 ft, with a top footprint of 12 X 50 ft and 2:1 side slopes. Quality control testing complied with state transportation standards.

The 20/80 CG-DM embankment was compacted to a minimum of 90 percent modified compaction, greater than the 97 percent standard compaction criterion required by PennDOT embankment construction specifications. During dry conditions, this criterion was usually met on the first proof-rolling attempt. Likewise, the 50/50 and 80/20 CG-DM posed no workability or compaction challenges, even though the compaction requirement was a minimum of 95 percent modified compaction. In fact, the 80/20 blend routinely made in excess of 100 percent relative compaction, as the DM used in the field trials has slightly more sand than the DM used in the laboratory compaction studies. Later, CPT testing on the 80/20 CG-DM embankment revealed an average CPT tip resistance of 30 tons/ ft^2 for its entire thickness, tested at three locations.

Pugmill blending operation

Compacting the blended mixture

Plate load and SPT testing of all embankments is currently under way. Complete (laboratory and field) project results will be available in December 2004. Interested parties may contact Tom Groff, USACE-Philadelphia District Operations at (215)656-6738 for more information. A DOER technical note will also be written documenting the study results after the project is completed.

New Dredging Committee established

At its last meeting, the COPRI Board approved the recommendation of the Waterways Committee to establish a Dredging Operations subcommittee. The purpose of the subcommittee is *to study and disseminate information on all aspects (technical, legal, policy, etc.) of dredging operations and its potential impacts. The subcommittee will establish and maintain contact with other organizations interested in the dredging process and seek opportunities for joint efforts. This subcommittee will also schedule and organize dredging conferences as a continuation of the Dredging '84, '94, and '02 series.* The Waterways Committee has been deeply involved in dredging for many years and has organized the previously mentioned dredging conferences.

Dr. Robert M. Engler will serve as the Committee Chairman. Bob is well-known nationally and internationally by the dredging community and is presently the Corps of Engineers Senior Scientist in the technical area that includes dredging. He holds leadership positions in both the International Navigation Association (PIANC) and the Western Dredging Association. These connections will serve him well in coordinating efforts with these and other organizations to produce activities that will benefit the profession as a whole.

Bob noted that "navigation is the key to our economy. It positions us as a formidable trading nation, and it allows us to serve as the world's strongest military and to be defense ready at all times. Without navigation, our humanitarian efforts would be a mere gesture. Dredging is the basis for navigation, both inland and coastal. Without it, we would only have flat-bottom boats calling at our ports and harbors. Dredging, though seemingly a routine construction technique, is being challenged at all fronts: environmental, engineering and economic. Dredging is proposed as a major technology for the cleanup of huge quantities of Superfund contaminated sediments, and this is not without serious controversy. We must have an innovative and economically viable dredging industry fully capable to meet environmental challenges, budget constraints, and pressure from foreign companies."

"I am pleased that ASCE through COPRI is posturing itself to increase its support of an environmentally sensitive and economically innovative dredging community of practice. I believe that this subcommittee, working with others, can lead this endeavor. I am looking for energetic people (engineers and non-engineers) to serve on the subcommittee. If you are interested, please contact me at *Robert.M.Engler@erdc.usace.army.mil*."

ACCORD WEDA Wrap-up

by James E. Clausner, U.S. Army Engineer Research and Development Center

A special open session was held at the WEDA XXIV and Texas A&M's 36th Annual Dredging Seminar, July 6-9th, 2004, in Orlando, FL. During the session, Neville Burt of HR Wallingford presented The **A**dvice and **C**onsultation **C**ommittee **o**n **R**esuspension due to **D**redging's (ACCORD) draft charter for input from government agencies, ports and harbors, dredging contractors, consulting engineers, and academia. The need for participation by these parties in ACCORD was then presented, followed by the solicitation of feedback from the audience.

ACCORD was formed by representatives from the U.S. Army Engineer Research and Development Center (ERDC), HR Wallingford and Dredging Research Limited (both of the UK), the Rijkswaterstaat (Netherlands), and the Dutch consortium of dredging contractors (VBKO). The main goal of ACCORD is to support research to develop the ability to predict resuspension from all the major dredge types and specialty dredges used for contaminated sediment cleanup.

Three possible ACCORD functions were discussed during the WEDA/TAMU session, along with the respective estimated funding that each level would require.

The first possible function of ACCORD is to be an information clearinghouse. A website containing sampling protocols, the ACCORD *Research Framework,* and past papers and presentations would be constructed and managed. New papers and presentations would be supported, annual meetings organized, and software disseminated. Updates on dredging-resuspension monitoring activities would also be provided.

An enhanced second level of ACCORD function was then presented. In addition to information distribution, the organization would also oversee updating monitoring protocols as new information becomes available, actively work with other government agencies/private groups to develop guidance and regulations, and work with monitoring organizations to recommend improvements and identify collaborators.

The third level of function for ACCORD would add the role of performing technical review of proposals and the distribution of funds for research.

The establishment of a steering committee and advisory committee for ACCORD was presented, along with proposed meeting schedules. The meeting concluded with an informal show of hands regarding the usefulness of ACCORD and the probable participation of attendees' organizations. The overwhelming majority, in both cases, was affirmative. ACCORD is therefore moving forward with website development and follow-up communication with interested parties from the WEDA meeting.

The ACCORD website, hosted on an ERDC server, is expected to be available in the next one to two months. It is expected that ACCORD will initially function at the information clearinghouse level. For additional information on ACCORD, contact Mr. Thomas Borrowman (601) 634-4048 (*Thomas.D.Borrowman@erdc.usace.army.mil*) or Mr. James Clausner (601) 634-2008 (*James.E.Clausner@erdc.usace.army.mil*).

Dredging Calendar

October 18-21, 2004 - 20th Annual International Conference on Soils, Sediments, and Water, University of Massachusetts at Amherst, *www.UMassSoils.com*, POC: *wrrc@tei.umass.edu*.

October 26-28, 2004 - Addressing Uncertainty and Managing Risk at Contaminated Sediment Sites, Marriott St. Louis Downtown, St. Louis, MO, *www.smwg.org*.

October 28-29, 2004 - Ecosystems Restoration and Creation Conference, Tampa, FL, *www.hccfl.edu/detp/ecoconf.html*.

November 16-17, 2004 - 7th Marine Transportation System Research & Technology Coordination Conference, National Academy of Sciences, Washington, DC. *http://www.TRB.org/Conferences/MTS*.

December 6-10, 2004 - 1st National Conference on Ecosystem Restoration, Orlando, FL, *http://coference.ifas.ufl.edu/ecosystem/*

January 24-27, 2005 - 3rd International Conference on Remediation of Contaminated Sediments, Sheraton New Orleans Hotel, New Orleans, LA, *www.batelle.org/sediments*, POC: sedimentscon@battelle.org

February 1-4, 2005 - Workshop on Bird Habitat Issues in the Southeast, American Bird Conservancy and U.S. Army Corps of Engineers, Jekyll Island, GA. *dpashley@abcbirds.org*.

March 14-17, 2005 - AEHS 15th Annual West Coast Conference on Soils, Sediments, and Water, Mariott Mission Valley, San Diego, CA, *www.aehs.com*, POC: *brenna@aehs.com*.

March 15-17, 2005 - Inland Waterways Conference, Nashville, TN, *http://www.inlandwaterwaysconference. com/*

April 26-28, 2005 - Dredged Material Assessment and Management Workshop, Boston, MA. POC: *billie.h.skinner@erdc.usace.army.mil*

June 6-9, 2005 - 8th International In Situ and On-site Bioremediation Symposium, Marriott Waterfront Hotel, Baltimore, MD, *www.battelle.org/biosymp*, POC: *info@confgroupinc.com*.

Dredged Material Assessment & Management (DMAM) Seminar Held in Cleveland

by Billie H. Skinner, U.S. Army Engineer Research and Development Center

The Environmental Effects of Dredging Programs Office, under the direction of Dr. Robert Engler, Senior Scientist (Environmental Laboratory), cooperatively with the Great Lakes and Ohio River Division, held a regional DMAM Seminar in Cleveland, OH, during 14-15 April 2004. Approximately 120 representatives of state and federal resource agencies, port authorities, local governments, non-profit groups, and consultants attended the training.

The two-day training was tailored to meet regional needs including legal and policy issues of dredging and dredged material management, procedures for sampling sediment proposed for dredging, chemical and biological testing procedures to evaluate management options, software for data analysis and modeling impacts, and case studies of uncontaminated and contaminated dredged material management. The focus of the seminar was on testing, assessment, and management of dredged material disposal for waters regulated under the Clean Water Act.

The next national DMAM Seminar will be held in Boston, MA, in April 2005, hosted and co-hosted by the New England District and the North Atlantic Division. An announcement will be made on the DOTS Website, *www.wes.army.mil/el/dots/training.html* in the fall of 2004. Questions regarding the DMAM training should be referred to Dr. Robert Engler, tel.: 601-634-3624; e-mail: *Robert.M.Engler@erdc.usace.army.mil*; or Billie Skinner, tel.: 601-634-3701; e-mail *Billie.H.Skinner@erdc.usace.army.mil*.

You are invited to attend...

What?

A Workshop on Bird Habitat Issues in the Southeast, sponsored by the American Bird Conservancy, in conjunction with the U.S. Army Corps of Engineers

Why?

First, to investigate means of minimizing impacts of Corps activities on birds along the South Atlantic coast. Second, to coordinate a number of tasks related to conservation of wintering Piping Plovers.

Where/When?

The workshop will be held at Jekyll Island, Georgia, on February 1-4, 2005.

Information:

The rationale for dealing with the two topics simultaneously is that many of the same people are involved in both issues, and both groups were planning workshops at approximately the same time. Joining them cuts down on travel costs for many people and creates a sense of synergy among topics from which all can benefit.

This will be the first of four workshops dealing with coastal Corps activities and bird conservation. This first workshop covers the South Atlantic Coast, essentially from the Virginia-North Carolina border to south Florida. Subsequent workshops, to be held over the next two years, will cover the North Atlantic, the Gulf Coast, and the Pacific Coast. Objectives are to expand capabilities of the Corps to contribute to various bird conservation plans, to make the bird conservation community aware of opportunities that exist through working with the Corps, to address and hopefully reduce some areas of conflict, and to improve interagency and organization cooperation for bird conservation in this region.

Schedule:

More details will be provided in the coming months in advance of the South Atlantic/Piping Plover workshop, but the general schedule is as follows:

Day 1: Technical issues regarding Piping Plover monitoring and conservation

Day 2: Beach nourishment and birds

Day 3: Other forms of dredged material placement (island or wetland creation, etc.) as bird habitat enhancement

Day 4: Interagency and Corps bird initiative interaction

This is structured so that Piping Plover technical issues are covered on day 1, issues of interest to all participants on days 2 and 3, and issues of infrastructural improvement on day 4. Attendees interested primarily in Piping Plovers can choose to attend days 1-3 only, and those interested primarily in Corps-related issues can attend days 2-4, if they so choose.

Those of you interested in continuing to receive materials related to the South Atlantic/Piping Plover workshop should notify David Pashley (*dpashley@abcbirds.org*) and Casey Lott (*clott@audubon.org*). In addition, Corps staff interested in attending this workshop should contact Rich Fischer (*fischer@wes.army.mil*). We look forward to your participation.

US Army Corps
of Engineers.
Engineer Research and
Development Center

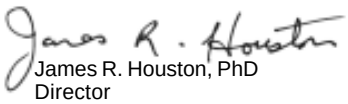
Articles for *Dredging Research* requested:

Dredging Research **is an information exchange bulletin for publication of ERDC-generated dredging research results. Included are articles about applied research projects. The bulletin serves all audiences and is accessible on the World Wide Web in addition to a paper circulation of 2,800.**

Articles from non-ERDC authors are solicited for publication, especially if the work described is tied to the use of ERDC-generated research results. Research articles that complement ERDC research or cover wide field applications are also accepted for consideration. Manuscripts should use a nontechnical writing style and should include suggestions for visuals and an author point of contact. Point of contact is Janean Shirley at *Janean.C.Shirley@erdc.usace.army.mil*.

Dredging Research

This bulletin is published in accordance with AR 25-30 as an information dissemination function of the Environmental Laboratory of the U.S. Army Engineer Research and Development Center. The publication is part of the technology transfer mission of the Dredging Operations Technical Support (DOTS) Program and includes information about various dredging research areas. Special emphasis will be placed on articles relating to application of research results or technology to specific project needs. The contents of this bulletin are not to be used for advertising, publication, or promotional purposes. Citation of trade names does not constitute an official endorsement or the approval of the use of such commercial products. Contributions are solicited from all sources and will be considered for publication. Editor is Janean Shirley, *Janean.C.Shirley@erdc.usace.army.mil*. Mail correspondence to the Environmental Laboratory, ATTN: DOTS, Dredging Research, U.S. Army Engineer Research and Development Center, Waterways Experiment Station (CEERD-EM-D), 3909 Halls Ferry Road, Vicksburg, MS 39180-6199, or call (601) 634-2349. Internet address: *www.wes.army.mil/el/dots/drieb.html*.



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